



Heating, Ventilation and Air Conditioning

Authors: Md Mobin¹, Prince Gupta², Rajan Shah³, Avinash Kumar⁴

Guide:

College: IIMT College of Polytechnic, Greater Noida

ABSTRACT: The field of heating, ventilation, and air conditioning –HVAC– is the science and practice of controlling indoor climate to provide healthy and comfortable interior conditions. HVAC systems and central system simultaneously control the temperature, humidity, purity, distribution and motion of the air in the interior spaces of the building. HVAC systems are generally used to ventilate and cool the building/Room. In the present study The system described. A split system, the most common type of air central air system, is composed of three parts. The condenser and compressor, which cool and move the Refrigerant, are installed outside, as they generate a lot of heat and noise. The evaporator and fan system, which cools and moves the air, is installed inside –usually in the attic or crawl space of your house. The ductwork carries the air from the evaporator to the rooms of your house.

Keywords: HVAC systems, compressor, condenser, indoor air quality, water recovery, retrofitting, refrigerants and ducts.

INTRODUCTION:

The field of heating, ventilation, and air conditioning –HVAC– is the science and practice of controlling indoor climate to provide healthy and comfortable interior conditions. HVAC systems simultaneously control the temperature, humidity, purity, distribution and motion of the air in the interior spaces of the building.

AIR CONDITIONING FOR COOLING

Air conditioning and refrigeration are provided through the removal of heat. Refrigeration may be defined as lowering the temperature of an enclosed space by removing heat from that space and transferring it elsewhere.

REFRIGERATION SYSTEM

Vapour Compression refrigeration is one of the many refrigeration cycles available and is the most widely used method for air-conditioning. This refrigeration system uses a circulating liquid refrigerant as the medium which absorbs and removes heat from the space to be cooled and subsequently rejects that heat elsewhere.

The vapour compression refrigeration cycle depends on two physical properties of matter:

1. A large amount of heat is required to change a liquid into gas. This heat is again released when the gas condenses back into a liquid.
2. The boiling and condensation temperatures of any material are a function of pressure. When the pressure is reduced, the boiling point is also reduced.

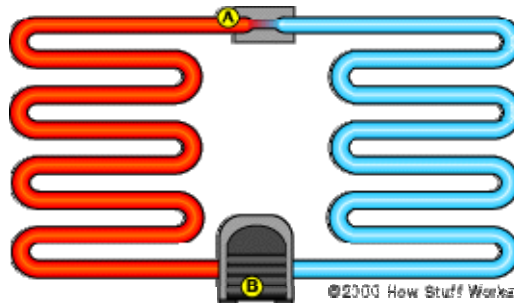
WORKING

An air conditioner removes the warm air from inside and cycles back in as cooler air. This cycle continues until the thermostat reaches the desired temperature. A basic air conditioner unit consists of a condenser, an evaporator and a compressor.

The liquid refrigerant in the condenser coil (in red in the figure) enters the low pressure evaporator coil (in blue in the figure) through the valve A. The refrigerant boils/ evaporates due to the very low pressure, and thus consumes heat. The evaporator coil thus cools to allow the liquid refrigerant to change into a gas.

To continue the cycle, the compressor B pumps the refrigerant gas into the condenser coil, and thus a high pressure gas collects at B. Since any gas under pressure heats up, the condenser coil gets hot. As the coil loses heat, the high pressure refrigerant gas is able to condense into the liquid refrigerant, which again enters the evaporator coil through the valve at A.

Fans blow air over the coils to improve their ability to dissipate heat (to the outside air) and cold (to the room being cooled).



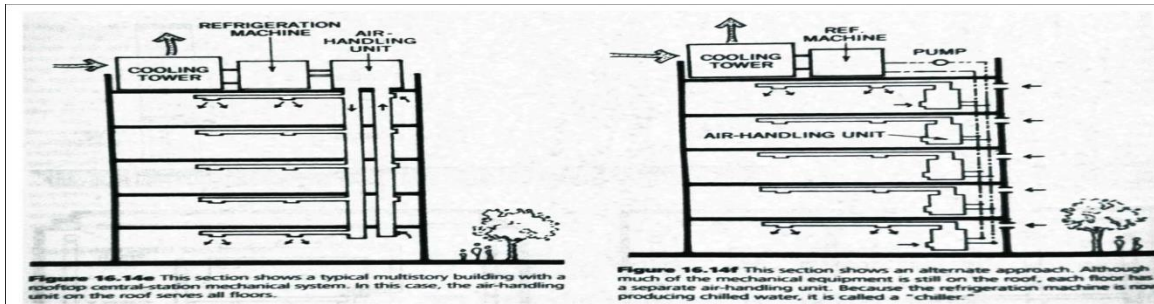
HVAC SYSTEM

There are many HVAC systems to choose from depending upon floor space, visual obstructiveness, maintenance, cost, etc. The two major types of HVAC systems are

1. **Central:** In a central system, heat is supplied to a building or extracted from it by large equipment situated in one or several large mechanical spaces. Air or water is heated or cooled in these spaces and distributed to the inhabited areas of the building by ductwork or piping to maintain comfortable temperatures.
2. **Local:** In a local system, independent, self-contained pieces of heating and cooling equipment are situated throughout the building, one or more in each room.

Central System: Central air conditioning, commonly referred to as central air is an air conditioning system that uses ducts to distribute cooled and/or dehumidified air to more than one room, or uses pipes to distribute chilled water to heat exchangers in more than one room, and which is not plugged into a standard electrical outlet.

With a typical split system, the condenser and compressor are located in an outdoor unit; the evaporator is



mounted in the air handler unit. With a package system, all components are located in a single outdoor unit that may be located on the ground or roof.

Central air conditioning performs like a regular air conditioner but has several added benefits:

When the air handling unit turns on, room air is drawn in from various parts of the building through return-air ducts. This air is pulled through a filter where airborne particles such as dust and lint are removed. Sophisticated filters may remove microscopic pollutants as well. The filtered air is routed to air supply ductwork that carries it back to rooms. Whenever the air conditioner is running, this cycle repeats continually.

CONCLUSION: Conventional HVAC systems calculate heavily on energy generated from fossil energies, which are being fleetly depleted. This together with a growing demand for cost-effective structure and appliances has needed new installations and major retrofits in enthralled structures to achieve energy effectiveness and environmental sustainability. Thus, chancing new ways towards green structures without compromising comfort and inner air quality remains a challenge for exploration and development. The overall attainable reduction in energy consumption and improvement of mortal comfort in the structures are dependent on the performance of HVAC systems.

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